

SECTION 5: COST ESTIMATING PROCESS

Section 5

As part of the alternatives development, conceptual (planning level) cost estimates were developed for the options being proposed. These estimates would be based on historical data, and standard treatment process capacities. When additional detail is available, more detailed estimates could be prepared than could be expected for conveyance facilities. These estimates used standard construction cost estimating procedures and formats. Every construction project presents unique conditions with respect to location, site constraints, and soil or geotechnical considerations. Also, construction industry market conditions can greatly affect project costing. By considering both historical costs as well as current cost estimating methods, an attempt was made to account for the range of potential costs. However, no estimates can be considered final until complete construction plans and specifications have been prepared. At the planning stage, these unit costs, as well project costs derived from them, need to be evaluated appropriately. Thus, these generalized costs are appropriate for comparison of alternative approaches to providing service, but additional detail should be provided for site-specific construction estimates.

5.1 SIZING OF FACILITIES

The sizing of all the wastewater treatment plant options are based on the projected flow data referenced in Section 2. In general, collection and treatment facilities were sized to meet the year 2040 Demands.

5.2 PHASING CONSIDERATIONS

In most of the subdivisions in Area 1A, 1B and 3, the subdivisions are existing and potentially built out. The phasing considerations specifically apply to the Area 2 where the planned and potential subdivisions are located. **Table 5-1** shows the flow data for the subdivisions of Lane Road, Seaport Lakes, Costa Grande and Powderhorn Ranch which are proposed to have a regional WWTP.

**Table 5-1 Projected Flow Data for Lane Road, Seaport Lakes,
Costa Grande and Powderhorn Ranch**

Year	Flow in MGD
2010	0.00
2015	0.01
2020	0.09
2025	0.26
2030	0.51
2035	0.68
2040	0.92
2060	2.14

5.3 CAPITAL COSTS

Cost estimates for each alternative were computed using costs for collection system improvements, conveyance system improvements (lift station and forcemain), treatment plant improvements and contingencies and professional services. To finance the capital costs of the new/regional WWTP, it was assumed that the existing subdivisions would obtain a 40-year loan with an interest rate of 3.92% through a municipal bond (Source: Rural Area Loan TWDB). And the proposed and new subdivisions were assumed to obtain a 22-year loan with an interest rate of 5.5% through municipal bond (Source: TWDB Loan). This data was used to calculate a monthly residential rate that provides a measure of the burden that the WWTP investment would place on the community's residents.

5.3.1 Collection System

Cost estimates for the wastewater collection system were prepared for each area assuming pressure sewers. Three types of collection systems were evaluated, vacuum sewers, pressure sewers and OSSFs. Vacuum sewers are an economical alternative in relatively flat areas, where a vacuum collection station can serve a very large area, eliminating numerous lift stations on the gravity system. A low pressure sewer system utilizing grinder stations at every one or two

homes is another viable alternative for a sewer system. The costs used for the collection systems are shown graphically in **Figure 5-1**. For detailed cost estimates, refer to **Appendix D**.

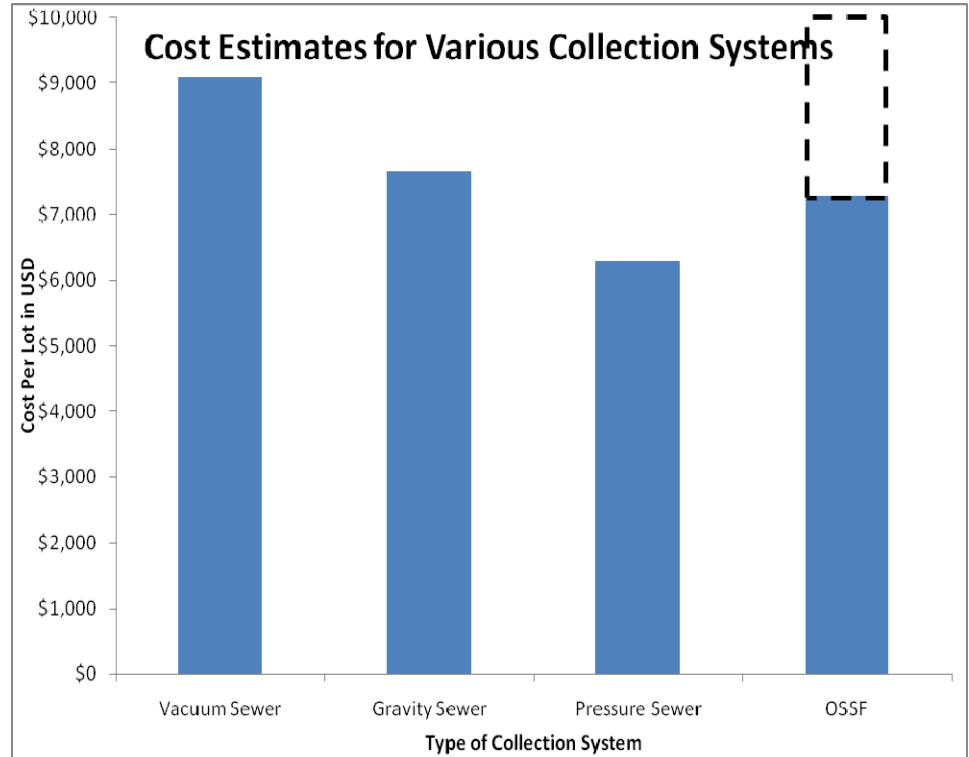


Figure 5-1 Collection System Cost Estimates

5.3.2 Conveyance System

Capital costs for the conveyance system (lift station and forcemains) were estimated by Urban Engineering using bid prices for similar work in the vicinity of Calhoun County and updated to 2011 prices using ENR construction cost indices.

5.3.3 Treatment Plants

The cost for wastewater treatment plants were calculated using historic unit construction costs for similar plants and updating them using the ENR construction cost index values for 2011. The graphic representation of the treatment plant capacity versus cost per gallon is provided in **Figure 5-2**.

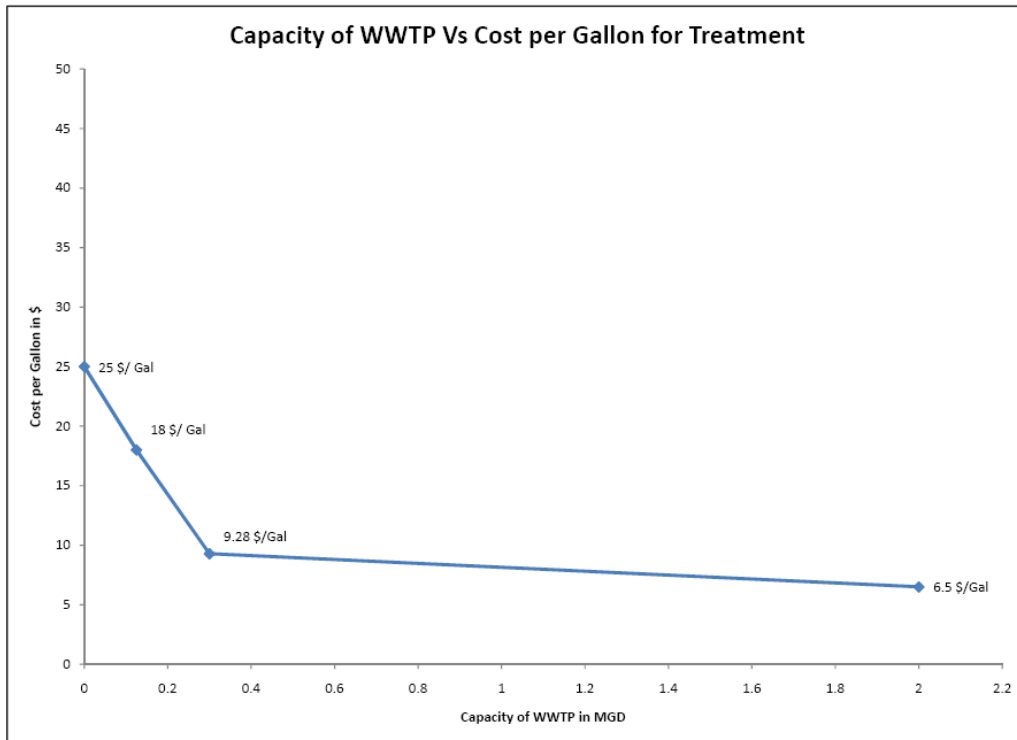


Figure 5-2 WWTP Cost Estimates in Cost per Gallon

5.3.4 Contingencies and Professional Services

The cost for unanticipated items, including variations in the construction economy and inflation are accounted for by using a contingency. For a project at this level of planning, a contingency percentage of 15% is used. At every stage of construction cost estimating, certain unknown factors need to be accounted for in the development of estimated costs. This is even true at the time final plans and specifications are completed for a specific project. It is especially critical at the planning stage. Engineering, Legal, Administrative, and Management markups account for several aspects of the projects. These include providing funds for performing the engineering design calculations, preparing plans and specifications, bidding the construction contract and awarding the work, contractor oversight, shop drawing review and approval, onsite inspection services, change order development, development of record drawings, and contract close out. They also account for the costs associated with legal review of construction contracts and the involvement of financial professionals in preparation of bond statements and the sale of bonds. The percentage of contingencies used in for estimating the construction costs are provided in Table 5-2.

Table 5-2 Contingency and Professional Services Percentage

Type of Contingency	Percentage assumed for calculations for cost estimating purposes
Construction Contingency	15
Professional Services (includes engineering services, permitting, administrative & legal)	20

5.3.5 Cost of Easements and Land Acquisition

The cost of easement and land acquisition are not included in the cost estimates. The collection system and conveyance system will be located for the most part in public right-of-ways and easements will not be required. The cost of the land for lift stations and treatment plants is difficult to estimate at this level of detail and could be considered a portion of the contingency.

5.4 OPERATION AND MAINTENANCE COSTS

The collection system operation, maintenance and replacement (O, M & R) costs are difficult to predict with the exception of electrical costs associated with lift station pumping. Wastewater treatment plant operating costs can be computed and show significant economies of scale. Historical data for plant operations of different sizes is shown in **Figure 5-3**. These treatment plant operating costs, on a per 1,000 gallon basis, along with the electrical costs for pumping wastewater from the subdivisions to either package treatment plants or regional treatment plants make up the bulk of the operations and maintenance costs for the alternatives evaluated. As with the capital costs, the operations and maintenance costs were expressed in terms of a monthly cost to each residential customer.

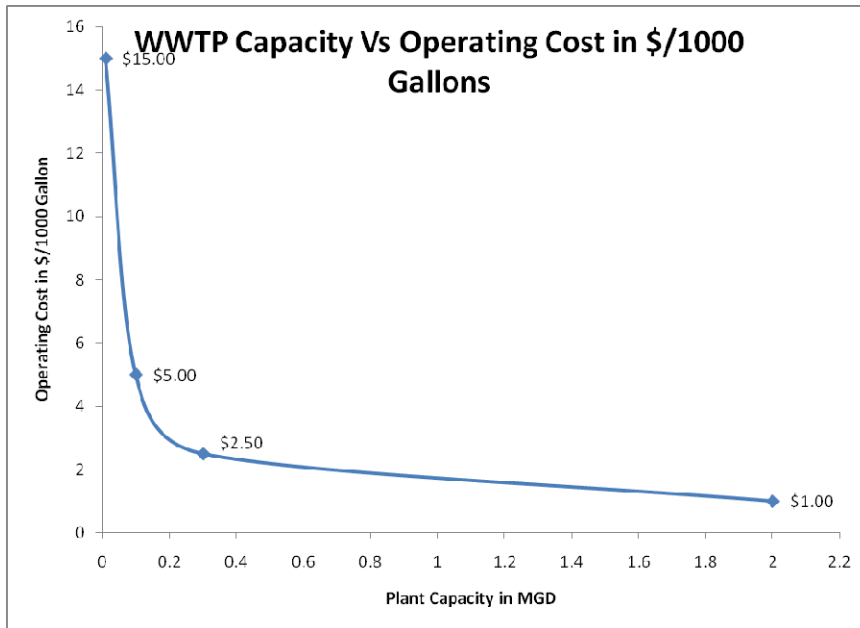


Figure 5-3 O&M Cost for WWTP

5.5 TOTAL COST

The total cost to project participants for each alternative was expressed in a monthly cost to liquidate the initial capital cost to construct the wastewater collection system, conveyance system and wastewater treatment plant, if included in the alternative, and the operating and maintenance cost. For alternatives that include package plants, this was the operating costs of the package plant. For alternatives that included pumping wastewater to an existing regional facility, the published cost for those regional entities to accept wastewater from out of city customers was determined and added to the monthly cost. Alternatives are compared on a cost per month basis. This was determined to be the most realistic method to judge the different alternatives because individual residences will have to be connected to the new wastewater collection and treatment system and if the financial burden is too large for the residents to realistically pay, then the alternative will not be financially feasible. The financial feasibility of the alternatives could be altered by the reduction of the initial capital costs by using grant funding. This will be discussed in subsequent sections of the report.